

EXAMPLE 13

A range of carrier materials were used in a standard procedure in which the stored active material is lactate dehydrogenase. In each case, a solution consisting of 0.05 g of carrier dissolved in 100 ml 0.01M phosphate buffer was prepared. 1 ml of 10 mg/ml lactate dehydrogenase solution was then added to 20 ml of the prepared solution. The solution thus created was divided into 0.5 ml aliquots in glass vials. These were dried under reduced pressure of about 80% atmospheric in a vacuum oven at 36° C. for 24 hours. After drying the vials were sealed and stored at ambient temperature. The product had a carrier:protein ratio by weight of 1:0.22.

Some samples were rehydrated immediately by addition of phosphate buffer. Others were stored for various lengths of time and then rehydrated. The activity of enzyme was determined as in Example 1. Activity of enzyme is expressed, in each case, as activity relative to that of enzyme rehydrated in the first week after drying. Results are set out in the following Table, in which "PVP" denotes polyvinylpyrrolidone, "GPS" denotes 6-O- α -D-glucopyranosyl-D-sorbitol. "Palatinit" is a product of Südzucker Aktiengesellschaft, Mannheim-Ochsenfurt, Germany, and consisting of an equimolecular mixture of α -D-glucopyranosyl-1,6-mannitol and α -D-glucopyranosyl-1,6-sorbitol.

Carrier	Storage period at 25° C. (weeks)											
	1	2	3	4	5	6	8	10	12	16		
Maltotriose	100	114		91		96	68	71	101	94		
Polydextrose	100	132		123		103	116	146	103			
Inulin	100	99		91		95	114	98	91			
Stachyose	100	122		137		140	109	106	127			
Dextran	100	81		71		89	102	91	95	84		
Sorbitose	100	93	75	76		55	66	65	58	62		
Polyacrylamide	100	100	80		71		53	62	55	63		
PVP	100	75				70	62					
GPS	100	124										
Palatinit	100	99										

We claim:

1. A composition which is storage stable at 20° C. comprising:

- a carrier substance which is water-soluble or water-swellaible and is in a glassy amorphous state;
- at least one material to be stored, which is unstable in aqueous solution at room temperature of 20° C. dissolved in said amorphous carrier substance, said composition existing in a glassy state at 20° C.

2. A composition according to claim 1 wherein the material to be stored is selected from proteins, peptides, nucleosides, nucleotides, dimers or oligomers of nucleosides or nucleotides, enzyme cofactors, and derivatives of any of the foregoing having one or more additional moieties bound thereto.

3. A composition according to claim 1 having a water content not exceeding 4% by weight.

4. A composition according to claim 1 wherein the composition displays a glass transition temperature of at least 30° C.

5. A composition according to claim 1 wherein carrier substance is selected from carbohydrates and derivatives thereof which are polyhydroxy compounds.

6. A composition according to claim 5 wherein the carrier substance is a sugar polymer containing sugar residues linked through ether bridges to bifunctional groups other than carbohydrate.

7. A composition according to claim 1 wherein the carrier substance is a synthetic polymer.

8. A composition according to claim 1 wherein said material to be stored comprises a material which is unstable when alone in aqueous solution at room temperature.

9. A composition according to claim 1 wherein said material to be stored comprises a plurality of materials.

10. A composition according to claim 9 wherein said material to be stored comprises a plurality of materials which react together in aqueous solution.

11. A composition according to claim 1 which can be stored without refrigeration for at least 1 week.

12. A method of rendering a material storage stable at 20° C., which material is unstable in aqueous solution at room temperature of 20° C., comprising dissolving the material in a carrier substance which is water-soluble or water-swellaible, or in a solution thereof, so that the material is dissolved in said carrier substance, and forming the resulting mixture into a glassy amorphous state,

said mixture existing in said glassy state at 20° C.

13. A method according to claim 12 wherein forming the said mixture into an amorphous state is effected by evaporation under subatmospheric pressure.

14. A method according to claim 13 wherein evaporation is commenced at a temperature of 20 to 40° C. and subsequently continued at a temperature of 40 to 70° C.

15. A method according to claim 13 wherein the subatmospheric pressure is not greater than 90% of atmospheric.

16. In a method of storing a material, which material is unstable in aqueous solution at 20° C., the improvement comprising dissolving the material in a carrier substance which is water-soluble or water-swellaible, or in a solution thereof, so that the material is dissolved in said carrier substance, forming the resulting mixture into a glassy amorphous state and storing the mixture in said glassy amorphous state without refrigeration for at least one week.

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